

# Hazardous Substances Emergency Events Surveillance

## 1999 Annual Report\*

*Debby Hanlon*  
Office of Surveillance

The Hazardous Substances Emergency Events Surveillance (HSEES) program, established by the federal Agency for Toxic Substances and Disease Registry (ATSDR) in 1990, collects information on the direct public health impact of emergency events involving hazardous substances. Missouri's HSEES program receives notifications of incidents involving hazardous substances from several sources, including the Missouri Department of Natural Resources' Environmental Services Program, the United States Coast Guard's National Response Center, the federal Department of Transportation's Hazardous Materials Information System, the Missouri State Highway Patrol, and the media. Additional information regarding releases is obtained from the Missouri Departments of Agriculture, Conservation, Public Safety and Transportation; local and regional environmental protection agencies; local public health agencies; first responders; incident commanders; individuals or businesses responsible for the spill; hospitals; employees; and witnesses and victims of hazardous substance emergency events.

The Missouri HSEES program has completed its sixth year of data collection. As the program continues, new notification and data sources are explored, and information is analyzed and shared to determine the public health impact of emergency events involving the release of hazardous substances in the state. All Missouri HSEES data is transferred to ATSDR through a web-based data entry system for analysis along with the data gathered from the other 14 participating states. Identifiers are encrypted upon transfer for confidentiality.

\* Data provided in this report for 1999 are preliminary. This report was supported by funds from the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) trust fund provided to the Missouri Department of Health under Cooperative Agreement Number U61/ATU780955-06 from the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services.

### Case Definition for Hazardous Substance Emergency Events

A hazardous substance release is entered in the HSEES system if it meets the following criteria:

1. An uncontrolled or illegal release or threatened release of one or more hazardous substances; and
2. The substances that are actually released or threatened to be released include ALL hazardous substances except petroleum products; and
3. The quantity of the hazardous substances that are released, or are threatened to be released, need (or would need) to be removed, cleaned up, or neutralized according to federal, state or local law; or
4. Only a threatened release of hazardous substances exists, but this threat leads to an action such as an evacuation that can potentially impact on the health of employees, responders or the general public. This action makes the event eligible for inclusion into the surveillance system even though the hazardous substances are not released.

Because the goal of the HSEES program is to reduce morbidity and mortality related to hazardous substances emergency events, it is important that the public, emergency responders, employees and industries receive information and feedback from the program concerning hazardous substance emergency events. In those cases where development of intervention strategies might prevent similar incidents, specific summary investigation reports are prepared and distributed to the community involved. Outreach activities are also conducted to promote prevention strategies and increase knowledge and awareness for industries, local emergency planning committees, emergency

responders, health care providers and the general public.

### Analysis of Data on Hazardous Substances Emergency Events

During calendar year 1999, 291 incidents were reported in Missouri that met the hazardous substances emergency event case definition (see sidebar). All of these events involved actual releases of hazardous substances. Of the total number of events, 279 (95.9%) involved the release of only one substance, and 12 (4.1%) involved the release of two or more substances. The most commonly released substance was ammonia, occurring in 36 (12.4%) events.

Reported events were scattered throughout the state, occurring in 59 counties and the City of St. Louis. This represents 52.2 percent of the counties in the state.

Events occurred primarily in counties where there are larger cities, interstate highways and large manufacturing or mining facilities. (See Figure 1 for the number of events occurring in each county.)

Of the 291 total events, 39 (13.4%) occurred on weekends and 252 (86.6%) occurred on weekdays. The actual number of events occurring by day of the week is: Monday (39), Tuesday (48), Wednesday (67), Thursday (61), Friday (37), Saturday (21) and Sunday (18).

Fixed facilities were involved in 165 (56.7%) of the events, while 126 events (43.3%) were transportation-related. Of the fixed-facility events, 66 (40.0%) were due to equipment failure and 55 (33.3%) were due to operator error. Thirty-eight (23.0%) events occurred due to factors other than those mentioned above. In the remaining six events (3.6%), the contributing factor was unknown. For transportation events, 115 (91.3%) involved ground transportation and 10 (7.9%) involved rail transportation. One event involved air transportation.

A total of 23 (7.9%) events resulted in 71 victims sustaining single or multiple

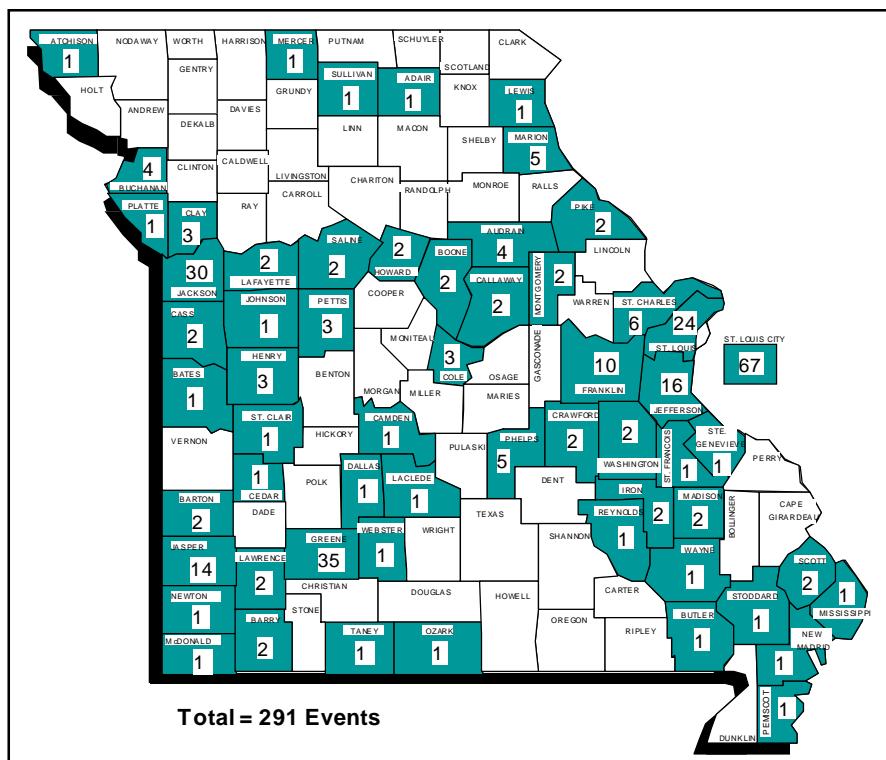


Figure 1. Number of non-petroleum hazardous substances emergency events by county, Missouri, 1999.

injuries (112 total injuries). Thirteen fixed-facility events resulted in 50 victims, and 10 transportation events resulted in 21 victims. Table 1 illustrates the percentage of events with victims and number of

victims by substance type. Some substance types, such as "Other inorganic substances", have a low percentage of events with victims, even  
*(continued on page 18)*

**Table 1. Percentage of Events with Victims and Number of Victims by Substance Type, Missouri, 1999**

Substance Type (events with one substance released)	No. of Events	%	No. of Events With Victims	%	Total No. of Victims	Percentage of Events With Victims
Acids	26	8.9	2	8.7	4	7.7
Ammonia	36	12.4	2	8.7	10	5.6
Bases	18	6.2	1	4.3	1	5.6
Chlorine	3	1.0	2	8.7	26	66.7
Other inorganic substances	41	14.1	1	4.3	1	2.4
Paints and dyes	19	6.5	1	4.3	3	5.3
Pesticides	8	2.7	2	8.7	3	25.0
Polychlorinated biphenyls	10	3.4	0	0.0	0	0.0
Volatile organic compounds	33	11.3	3	13.0	4	9.1
Other substances	69	23.7	3	13.0	4	4.3
Mixtures*	16	5.5	1	4.3	5	6.3
<b>Subtotal</b>	<b>279</b>	<b>95.7</b>	<b>18</b>	<b>78.0</b>	<b>61</b>	<b>6.5</b>
Multiple Substance Events**	12	4.1	5	21.7	10	41.7
<b>Grand Total</b>	<b>291</b>	<b>99.8</b>	<b>23</b>	<b>99.7</b>	<b>71</b>	<b>7.9</b>

\* One substance comprised of a mixture of substances of different types

\*\* Events involving the release of more than one substance type

\*\*\* Total percentages less than 100% due to rounding to the nearest decimal point

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though these substances are more frequently released; however, two of the three events (66.7%) involving the release of chlorine had a total of 26 victims.

The most common types of injuries reported were respiratory irritation (39), eye irritation (29), trauma (13) and gastrointestinal symptoms (9). Injuries experienced also included chemical and thermal burns, skin irritation and headache. (See Figure 2.)

Of the 71 victims, 24 were employees, 7 were responders (police, fire, and emergency medical technician personnel), and 40 were members of the general public (including one student). Ten victims were treated at the scene of the event, 46 were treated at a hospital but were not admitted, 7 were treated at a hospital and admitted, 5 were taken to a hospital with symptoms and were observed (not admitted or treated), and 3 victims died.

The greatest number of injuries in a single event occurred when 1,000 pounds of chlorine gas were released as a cylinder was being loaded into a delivery truck by a crane and dropped to the ground. The gas began to leak when a seam ruptured, making it impossible to plug or patch. Two employees and 23 members of the general public who resided in the area suffered respiratory and eye irritation as a result of exposure. One victim was admitted to the hospital; the remaining 24 victims were treated and released. The cost for the HAZMAT team's response was estimated to be more than \$7,500.00. The cost to the facility in lost wages and productivity was not determined. In addition to the victims, approximately 150 individuals (employees and residents of the area) were evacuated and kept off their properties for seven hours, and a major highway was closed for five hours.

Three fatalities occurred in three separate events. Two deaths were transportation-related and one death occurred at a fixed facility. In the first transportation-related event, an individual was driving a car on

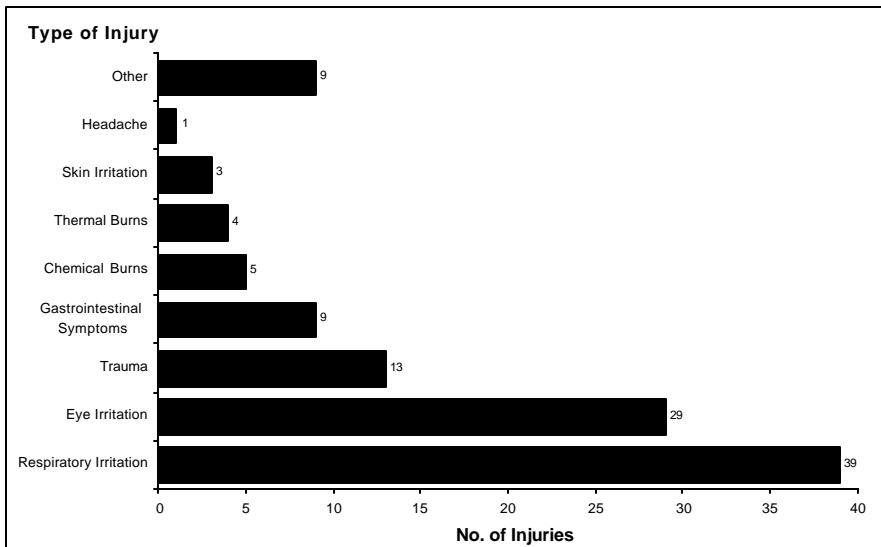


Figure 2. Number of injuries reported by type, Missouri HSEES, 1999.

an interstate highway. The passenger was holding a makeshift canister of anhydrous ammonia on his lap. The container exploded, resulting in the passenger's death. The driver suffered severe injuries and was hospitalized for seven days. One firefighter, one emergency medical technician and one individual from the general public, all of whom stopped to help, suffered from respiratory problems and inhalation burns. The cause of the smoke emanating from the car was not immediately known when these individuals pulled the driver and passenger away from the car. It is alleged that the ammonia was to be used for methamphetamine production.

The second transportation-related death occurred when a tanker trailer overturned and released six gallons of sodium hydroxide. The driver of the vehicle died from injuries sustained after being ejected from the vehicle.

The third fatality occurred in an explosion at a fireworks factory. One employee died from trauma and burns sustained during the explosion. Another employee, who was pregnant, suffered serious injuries and required an emergency Cesarean section.

Evacuations were ordered by an official in 30 (10.3%) events. Twenty-seven evacuations involved a total of 2,393 people. The number of people evacuated in three events is unknown. Sixteen

evacuations involved a building or an affected part of a building, six were within a specified radius of a release, four were downwind, two were both within a specified radius and downwind, and two were made with no defined criteria for the evacuated area.

One event involving the release of anhydrous ammonia had the largest number of people evacuated. An estimated 250 pounds of anhydrous ammonia were released due to a faulty valve at a chicken processing plant. Approximately 540 people at the facility and at a nearby campground were evacuated for two hours. The incident occurred at 3:00 a.m. on Memorial Day.

## Reporting Events

The Missouri HSEES program is indebted to the Missouri Department of Natural Resources' Environmental Services Program for helping to investigate these hazardous substances emergency events. The HSEES program relies heavily on this unit for notification of events and frequently contacts them for information regarding releases.

For additional information, please visit the HSEES web site at <http://www.health.state.mo.us/hsees> or contact: Debby Hanlon, HSEES Coordinator, Missouri Department of Health, P.O. Box 570, Jefferson City, MO 65102-0570, Ph: (573) 526-1686.